DIRECTORATE FOR BIOLOGICAL SCIENCES

Arabidopsis thaliana Information Resource Project (AtIR)
Division of Biological Infrastructure

DEADLINE: MARCH 22, 1999

NATIONAL SCIENCE FOUNDATION

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MATRIX OF PROGRAM REQUIREMENTS

General Information

- **Program Name:** *Arabidopsis thaliana* Information Resource Project (AtIR)
- **Short Description/Synopsis of Program:**

The Directorate for Biological Sciences (BIO) of the National Science Foundation (NSF), through the Biological Database Activities Program in the Division of Biological Infrastructure, has identified as a priority support for the design, development, and implementation of biological information resources for the Multinational Coordinated *Arabidopsis thaliana* Genome Research project. Therefore, the Biological Database Activities Program announces a special competition for an on-line resource to extend, maintain and distribute a user focused, on-line resource for biological information on *Arabidopsis thaliana*, termed here the ***Arabidopsis thaliana*** Information Resource (AtIR). The successful awardee of this competition will be required to incorporate and build on the existing *Arabidopsis thaliana* Database (AtDB, *http://genome-www.stanford.edu/Arabidopsis/*), which continues to be an unique resource in its role as a primary repository of *Arabidopsis* information.

- **Cognizant Program Officer(s):**

  Paul Gilna, by phone (703) 306–1469 or by e-mail *pgilna@nsf.gov*

- Applicable Catalog of Federal Domestic Assistance (CFDA) No.: **47.074—Biological Sciences**

Eligibility

- Limitation on the categories of organizations that are eligible to submit proposals: **None**
- PI eligibility limitations: **Limited to categories 1 and 2 of the Grant Proposal Guide *(GPG)* NSF 99–2, Chapter I, Section D**
- Limitation on the number of proposals that may be submitted by an organization: **None**

Award Information

- *Type* of award anticipated? **Grant or Cooperative Agreement**
- Number of awards anticipated in FY 1999: **1**
- Amount of funds available: The total award size is expected to range up to $1 million per year for 5 years.
- Anticipated date of awards: August 1999

Proposal Preparation Instructions

Proposal preparation instructions: **Standard Grant Proposal Guide (*GPG)* plus supplementary guidance**

Deviations from standard *GPG* proposal preparation instructions: **PIs must complete the BIO Proposal Classification Form (PCF)**

Budgetary Information

Cost sharing/matching requirements: **None**

Indirect cost (F&A) limitations: **None**

Other budgetary limitations**: Funds may not be requested or used for construction or renovation of facilities.**

FastLane Requirements

Use of FastLane in Proposal Preparation & Submission: **Entire Proposal Required**

FastLane point of contact for this program: **E-mail biofl@nsf.gov**.

Deadline/Target Dates

Full Proposal Deadline: **March 22, 1999**

Proposal Review Information

- Standard NSB Approved Merit Review Criteria plus supplementary criteria

Description of supplementary criteria: In addition, reviewers will focus on the following issues:

- responsiveness to the expected scope
- potential to advance international *Arabidopsis* genome and plant research;
- effectiveness of the project's organizational plan to reflect technical advances and new scientific discoveries;
- extent to which operation is focused on research community's needs;
- soundness and openness of the information-sharing plan and management of intellectual property rights;
- quality of the training environment for junior scientists; and,
- commitment to promote participation of members of underrepresented groups.

Where appropriate, reviewers will also consider:

- cohesiveness and soundness of the planned coordination for a multi-investigator project; and,
- efficiency and cost-effectiveness of the proposed approach for infrastructure development.

Award Administration Information

Special grant conditions anticipated: **None**

INTRODUCTION

The Directorate for Biological Sciences (BIO) of the National Science Foundation (NSF), through the Biological Database Activities Program in the Division of Biological Infrastructure, has identified as a priority support for the design, development, and implementation of biological information resources for the Multinational Coordinated *Arabidopsis thaliana* Genome Research project.

The Multinational Coordinated *Arabidopsis thaliana* Genome Research project was established in 1990 to develop *Arabidopsis thaliana* as an experimental model system for flowering plants. During the next several years, the sequence of the *Arabidopsis* genome will be completed and extensive sequence and mapping information will become available for this and many other plant species. New technologies such as microarrays and gene chips now present the capacity to study the functional expression of thousands of genes at a time, while new capabilities in creating libraries of insertional mutations will allow detailed studies and ultimately manipulation of specific gene function. Drawing on the original goals of embarking on model organism genomes, the value of the *Arabidopsis* project lies in the utility of the information gathered in seeking to understand the biology of flowering plants.

Therefore, the Biological Database Activities Program announces a special competition for an on-line resource to extend, maintain and distribute a user focused, on-line resource for biological information on *Arabidopsis thaliana*, termed here the ***Arabidopsis thaliana*** Information Resource (AtIR). The successful awardee of this competition will be required to incorporate and build on the existing *Arabidopsis thaliana* Database (AtDB, *http://genome-www.stanford.edu/Arabidopsis/*), which continues to be an unique resource in its role as a primary repository of *Arabidopsis* information

PROGRAM DESCRIPTION

The ***Arabidopsis thaliana*** Information Resource (AtIR) is expected to serve as a repository for data and information generated from multiple genomic studies on *Arabidopsis*. Operational priorities for this project will be predominantly needs-driven as defined by the *Arabidopsis* (and related) research communities, and as gathered through mechanisms established by the awardee. While it is understood that some software development will be required to meet these needs, the major mission of AtIR should be viewed as the collection, entry, and updating of data and information.

The project will be expected to focus on specific needs that have been defined by the Arabidopsis research community during the course of meetings held in Dallas, Texas in 1993 (*http://genome-www.stanford.edu/Arabidopsis/db/dallas.report.html*) and updated in a meeting in Madison, Wisconsin, in 1998 (*http://genome-www.stanford.edu/Arabidopsis/db/database.needs.html*).

Integration of Arabidopsis physical and genetic map data.

The greatest current need is a unified genetic and physical map that incorporates all available information about polymorphic markers (*e.g.*, CAPS, SSLPs, RFLPs), mutations, BAC and YAC clones, mapped clones and insertions or other modifications of the genome. This should be viewed as a critical component of the AtIR service.

Phenotypic and Genotypic Information.

Because of the diversity of processes that are being analyzed by a mutational approach in *Arabidopsis*, there is a need for the entire scientific community to have facile access to information about gene function as it relates to the organism. This capability will greatly enhance the efficiency with which new mutations will be studied as the number of known mutations begins to plateau. AtIR will be expected to incorporate this capability.

Interoperation with databases of related information.

AtIR should contain cross-references to all other relevant databases (e.g., GenBank nucleotide sequence database; *Arabidopsis thaliana* stock center databases; cell and/or probe repository catalogue number(s); and genetic map databases for other species showing significant synteny with *Arabidopsis thaliana*).

Storage and dissemination of expression data. Most or all of the *Arabidopsis* genes will be used to develop gene chips or microarrays that permit simultaneous measurements of the expression (mRNA levels) of all of the genes. The use of microarrays and gene chips are expected to provide a massive amount of new information. The ability to query this information may provide insights into the identity of otherwise anonymous genes, reveal the existence of networks or identify factors that cause altered expression of a gene. While it is not necessarily expected that the AtIR will serve as a primary repository for such data, it is expected that user access to such resources will be enabled through the use of appropriate links to other such databases.

Links to stock-based information. The databases maintained by the two *Arabidopsis* resource centers at Ohio State University and the University of Nottingham provide excellent access to information on the availability of biological and chemical materials related to *Arabidopsis* research. These databases will continue to assume responsibility for descriptive information concerning seed stocks, clones, vectors, libraries, cDNAs, oligonucleotides, and any other materials that may require distribution to the *Arabidopsis* community. The AtIR should be directly linked to the stock center databases so that queries about the properties of a gene or mutant can lead in turn to information about the availability of, and ordering procedures for, associated reagents.

Mechanisms for data acquisition by direct submission.

The task of data acquisition would be greatly facilitated if members of the *Arabidopsis* research community could deposit data directly. The AtIR should include a plan for creating user-friendly interfaces that can be used by scientists to deposit data directly to the AtIR via the internet, and address approaches to be taken to encourage direct submission of data from the research community.

Curation and maintenance of data.

Curation and maintenance refers to the need to add, validate and update the biological attributes of repository data. Approaches to this task have ranged from an "in-house" staff of curators or annotators to dependency on community-based methods of data correction, maintenance and updating, to, conceivably, a highly automated suite of computational tools. Curation of data in an *Arabidopsis* data resource has been and will continue to be an important community need and will be an important facet of the AtIR operation. Proposors will be expected to outline approaches to this task and address the utility of automated or community-based approaches to data curation.

Extensibility of database architecture to other plant genome information management projects.

The *Arabidopsis* database should use industry-standard hardware and software, so that it is both compatible, and can communicate transparently with, other databases. An important principle in designing the resource will be that the storage architecture is structured in a form that makes it possible to interface easily with other databases. Some consideration should be given to production of generic database structures that can potentially be adopted for use in a variety of different organisms and particularly in related mapping and/or sequencing activities in the Plant Genome Research community.

Summary

Proposals submitted in response to this announcement must discuss the structure of the proposed database with these goals and scope in mind, and provide detailed plans for long-term management and distribution of the database. The data should be structured and maintained in a way that permits the development and use of complex queries by knowledgeable users or by third party software developers. The AtIR will be expected to collaborate with other efforts relevant to plant databases, both nationally and internationally. Plans detailing how such collaborations might work should be provided. However, formal arrangements for the collaborations need not be made prior to an award. The proposals must also provide plans for the incorporation into the AtIR of information currently found in the *Arabidopsis thaliana* Database (AtDB) and for the timely assumption of responsibility for data entry, repository maintenance and database distribution, all of which are now provided by AtDB.

ELIGIBILITY

The *Arabidopsis thaliana* Information Resource Project competition, will accept applications from eligible institutions as described in the NSF *"Grant Proposal Guide" (GPG)*, NSF 99–2, Chapter I, Section D, in categories 1 and 2 only. The *GPG* is available on the NSF web site at the URL (*http://www.nsf.gov/cgi-bin/getpub?nsf992*). Paper copies of the *GPG* may be purchased from the NSF Publication Clearinghouse, P.O. Box 218 Jessup, Maryland 20794–0218, telephone (301) 947–2722, or by e-mail from *pubs@nsf.gov*.

Consortia of eligible individuals or organizations may also apply, but a single individual or organization must accept overall management responsibility. International collaboration is encouraged; however, financial support for any non-U.S. participant organization must be provided from within the participant's country or other non-U.S. sources.

PRINCIPAL INVESTIGATOR AND OTHER SENIOR STAFF

The Principal Investigator (PI) and other senior staff responsible for the project must have the necessary skills to successfully carry out the tasks covered in this announcement, or the proposal must present convincing plans to hire such staff. The PI should have demonstrated the leadership necessary to meet the challenges of managing a large community database in a rapidly changing technological and scientific environment. The PI and other members of the senior staff should, in the aggregate, have experience with aspects of plant biology research relevant to the database, have current knowledge about computerized databases and their management, and have a demonstrated ability to interact with the members of the various scientific disciplines and other groups important for the successful operation of the database. Experience with the successful management of a database effort of comparable scope and complexity will be considered an important asset.

AWARD INFORMATION

The NSF expects to make one five year award in Fiscal Year 1999 depending on the quality of submissions and the availability of funds. The total award size is expected to range up to $1 million per year. The exact amount will depend on the advice of reviewers and on the availability of funds. It is anticipated that the award will be administered as a grant or cooperative agreement.

Note, while the term "award" and "awardee" used herein imply a single entity, NSF is not necessarily constrained by this model and is open to proposals of innovative models involving more than one entity by which the primary functions of AtIR might be administered (*e.g.*, a "virtual resource"). Again, a single individual or organization must accept overall management responsibility.

INSTRUCTIONS FOR PROPOSAL SUBMISSION

A. Proposal Preparation Instructions

Proposals to *Arabidopsis thaliana* Information Resource (AtIR) Project competition require electronic submission via the NSF FastLane system in accordance with the guidelines provided in the "Instructions for Proposal Preparation" found in the *GPG*, Chapter II. The *GPG* is available on the NSF Web Site at the URL *http://www.nsf.gov/cgi-bin/getpub?nsf992*. Paper copies of the *GPG* may be purchased from the NSF Publication Clearinghouse, P.O. Box 218 Jessup, Maryland 20794–0218, telephone (301) 947–2722, or by e-mail from *pubs@nsf.gov*.

Include in proposals to AtIR the components listed in *GPG*, Chapter II, Section D. State information in each component as clearly and concisely as possible for merit review. Take special care in adhering to the requirements for page limitations, font size, and margins (see *GPG*, Chapter II, Section C). **Proposals not strictly adhering to the requirements of the *GPG* and these guidelines are returned without review.** Instructions and guidelines for the FastLane submission of proposals are detailed in *Instructions for Preparing and Submitting a Standard Proposal via FastLane* located at *https://www.fastlane.nsf.gov/a1/newstan.htm*. Also, see the "FastLane Submission" section below.

Guidelines are provided for specific sections of the proposal as follows:

- **Proposal Cover Sheet (NSF Form 1207)**

In the NSF FastLane system follow instructions on proposal preparation. When completing the Cover Sheet click on the "Add Org Unit" button. Highlight "DIRECT FOR BIOLOGICAL SCIENCES" and click "OK." Highlight "Database Activities" and click "OK." Clicking "OK" designates this program as the NSF organizational unit of consideration. In the box labeled "Program Announcement/Solicitation No." enter "NSF 99–50" with no additional characters.

Begin the title of the proposal with "AtIR: . . . ."

The first-listed Principal Investigator (PI) is designated as the primary PI and is responsible for coordinating the entire proposed project.

- **Project Summary**

Provide a brief (200 words or less) description of the project.

- **Project Description (maximum length 25 pages)**

Particular attention must be paid to the following major aspects in preparing a description of the proposed project. Although some relevant technical issues are mentioned below, these details are intended only as guidelines. This section must not exceed 25 pages inclusive of tables, diagrams or other visual material. Clearly label sections and major subdivisions of the project description.

Long-Term Vision

Describe your vision for the long-term future of such a database as the AtIR and the role this operation should play in the overall plant genome research forum. Address issues such as long-term economic sustainability of the database, potential economic models that invoke alternative sources of support, and possible transition plans to such models.

Repository Structure

The proposal should provide a description of (1) the logical or conceptual model for the data, and (2) a general outline of the physical implementation schema for the repository. The general features and overall design of both must be justified in the context of efficient data management and researcher support functions. Extensibility of the design to the maintenance of data and information from other databases of plant research information may be discussed here.

Data Acquisition

Proposals should describe the manner in which the data to be placed in the resource will be acquired. Specifically, if it is intended that data be acquired from investigators as the original source of the data, procedures for the handling of such submissions should be described, including any standard or proprietary data exchange formats or tools to be used.

Because it is anticipated that the volume and rate of data generation will continue to increase in the future, an important technical issue to be considered is the development and use of approaches which are capable of scaling to anticipated increases in the volume of data.

Database Content

Proposals should describe precisely the expected content of the database. The description should include some definition of what constitutes a minimum dataset, as well as a description of what might constitute a fully annotated dataset.

Minimum criteria for insuring the completeness and consistency of entries at the time they are placed in the database should be described, as should procedures for assuring that the criteria have been met. It is expected that the utility of the criteria and procedures will be periodically reviewed and approved using the formal external advisory mechanism.

Database Maintenance

Proposals should address the technical issues involved in the maintenance of a highly automated information repository, with convenient public access and off-site backup or other provision for protection from software or hardware failure. Provisions for maintenance of internal and external links should be discussed. The focus of the proposal should be the operation of a basic repository.

Database Distribution

Proposals should also describe the distribution methods envisioned, for example network access to the complete collection using the WWW or other means, and periodic production of tapes, CD-ROM or other media containing current entries.

If mirror sites are to be used, describe how the central and mirror sites will interact, estimate the time and effort required to operate a typical mirror and provide the criteria to be used in selecting mirror sites.

Any planned charges for copies on tape or other media, or for permission to provide such copies, should be discussed briefly in the proposal. All such charges will be subject to approval by the NSF. Periodic assessment of the utility of the distribution methods will be expected as part of the management and oversight of the AtIR.

NSF expects that Principal Investigators agree to complete and open sharing of data and material in an expeditious manner. By submitting a proposal, it is understood that the submitting institution and all participants agree to these guidelines (see the NSF *GPG*, NSF 99–2, Chapter VII, Section H).

Direct Access

Describe how users will be able to develop and use direct queries of the database. The interaction with the repository and the means to insure stability and security should be specified.

Assumption of Responsibility for Database Operation

Provide a timetable for the assumption of responsibility for new data entry and distribution of the database, including any efforts necessary for incorporation of entries now found in the AtDB into the new database. It is anticipated that the time required for complete assumption of the responsibility will not exceed one year from the date of the award.

Quality Control

Describe provisions for insuring the quality of the database and its operation, including procedures for obtaining and responding to user feedback on issues related to quality.

Management

A sound management plan will be a crucial aspect of the proposal. The responsibilities of the various senior personnel must be clearly described, as must the time and effort to be committed by each. A mechanism for replacing key personnel who leave the project must also be described. In the event senior personnel will participate in multiple activities related to the database (e.g., outreach, data acquisition, etc.), estimate the anticipated effort with respect to each activity.

External Input/Advice

The awardee will be expected to establish a formal mechanism for insuring ongoing external input from relevant groups and interested individuals regarding AtIR policies and practices. An appropriate mechanism could, for example, consist of a standing external advisory board with relevant technical and managerial expertise. The function of such an advisory board could be to advise senior management of the AtIR and the awardee institution(s) on policies such as those regarding operational priorities, format, content and validation of entries and reports, those related to other aspects of use or distribution of the database, etc. Periodic review and approval of the utility and appropriateness of any such criteria will be expected.

Implementation of the mechanism should insure that the views of relevant research communities are represented as part of this advice. In general, the mechanism should provide an opportunity for input from the international *Arabidopsis* research community. The appropriateness and adequacy of the mechanism, as implemented, will be subject to approval by the NSF.

Outreach and Training

Describe provisions for timely and widespread communication of activities of the AtIR, in particular procedures for alerting user/developer communities to impending changes in software/formats/policies, etc. Describe any activities planned to train new or experienced users in use of the resource. Activities supported by this award may provide an ideal environment to train young scientists in cutting-edge research technologies and to expose them to new paradigms in plant biology informatics. In addition, these activities should promote increased participation by members of under-represented groups. Proposers should describe plans to increase diversity whenever feasible.

Results From Prior NSF Support (maximum length 5 pages)

If the PI or any Co-PI has received federal support for the establishment or operation of a publicly available database within the last five years, provide a brief description of the relevant features of the database together with the name of the agency providing support, the award number and title, and the amount and duration of the award. This section should include a general description of the type of database, number of users, means of distribution, etc. If the database is available electronically, provide the relevant URL. If awards for more than one project have been received, describe the project most relevant to the current proposal. **This section is limited to a maximum of 5 pages, including any references and is included as part of the Project Description 25 page limit.**

- **Biographical Sketches**

For each of the key personnel, including senior staff and any other staff whose participation is critical to the success of the project, provide a curriculum vitae or short biographical sketch. Briefly describe relevant experience and list up to 10 publications (to include the individual's 5 most important and up to 5 other relevant publications). Include an alphabetical list of current and past collaborators of all key personnel whose biosketches are included, and of any other staff or collaborators mentioned by name in the proposal. Additionally, include names of all gradu-

ate students and postdoctoral fellows who have trained with these individuals, as well as anyone with whom these individuals have co-authored a paper within the last 4 years. The information may not exceed 2 pages for each individual. Applicants may include letters of support in the FastLane submission by scanning the documents and adding them at the end of the Project Description file, clearly labeled.

Copies of letters indicating agreement to participate should be provided by all senior personnel who do not endorse the cover page as PI or Co-PI. Such letters should include a brief description of the individual's expected role in the project and an estimate of the time and effort to be required. Scan the letters and add them at the end of the Project Description file, clearly labeled as Appendix A. **This information *is not*** counted as part of the 25 page limit of the Project Description.

- **Budget (NSF Form 1030)**

Provide a budget and budget justification for each year of support requested as well as a separate, cumulative budget for all years. If funds for subcontracts are requested, then a separate budget and budget justification must be prepared by each subcontractor to show the distribution of subcontract funds across categories. Funds for facility construction or renovation may not be requested.

A brief justification for funds in each budget category should be provided. For major equipment or software materials, a particular model or source and the current or expected price should be specified whenever possible. A brief explanation of the need for each item whose cost exceeds $10,000 should be provided. This section should also include details of institutional cost sharing, if any, and of other sources of support for the project, such as government, industry, or private foundations. Although cost sharing is not required, any such commitment specified in the proposal will be referenced and included as a condition of an award resulting from this solicitation.

Appropriate documentation of any such commitments should be provided in an appendix (Appendix B). Scan the documents and add them at the end of the Project Description file, clearly labeled as Appendix B. **This information *is not*** counted as part of the 25 page limit of the Project Description.

- **Current Support (NSF Form 1239)**

Provide a complete list of current and pending support for all PIs and Co-PIs

- **Facilities, Equipment, & Other Resources (NSF Form 1363)**

Include a brief description of available facilities, including space and computational equipment available for the project. Where requested equipment or materials duplicate existing items, explain the need for duplication. This section is limited to 2 pages.

- **BIO Proposal Classification Form (PCF)**

Complete the BIO PCF, available on the NSF FastLane system. The PCF is an on-line coding system that allows the Principal Investigator to characterize his/her project when submitting proposals to the Directorate for Biological Sciences. Once a PI begins preparation of his/her proposal in the NSF FastLane system and selects a division, cluster, or program within the Directorate for Biological Sciences as the first or only organizational unit to review the proposal, the PCF will be generated and available through the Form Selector screen. Additional information about the BIO PCF is available in FastLane at *http://www.fastlane.nsf.gov/a1/BioInstr.htm*.

- **Special Information and Supplementary Documentation**

Plans requiring collaborative effort by an individual not employed at the submitting institution(s) should be supported by a signed letter from the individual. Besides indicating a willingness to collaborate, the letter should provide a brief outline of the goals of the collaboration and estimate the time and effort the individual expects to devote to the collaboration. Biographical sketches should not be provided for such individuals, unless requested by NSF. A collaborator whose primary purpose is advisory (e.g., service on a committee that will provide policy advice) does not need to provide/submit such a letter.

Scan the letters and other relevant Special Information and Supplementary Documentation, as specifically described in the *GPG*, Chapter II, Section D.12, and add them at the end of the Project Description file after Appendices A and B, clearly labeled as "Special Information and Supplementary Documentation." Only documentation as described in the *GPG*, Chapter II, Section D.12 and detailed above is allowed. **This information *is not*** counted as part of the 25 page limit of the Project Description.

- **Appendices**

Only the appendices described in the "Budget Justification", and "Biographical Sketches", are allowed. Other letters of endorsement may not be included.

B. Proposal Due Dates

Proposals must be sent by 5:00 p.m., submitter's local time, March 22, 1999 via the NSF FastLane system.

Mail the following materials directly to the Biological Database Activities Program:

- a paper copy of the cover sheet, including the completed certification page (page 2 of 2) signed by the PI and all Co-PIs and by an institutional representative; and
- the BIO classification form.

Do not mail copies of the full proposal. NSF will make the appropriate number of copies of the proposal.

The grantee is responsible for ensuring that the materials are **received** by March 26, 1999. Send materials to:

Arabidopsis thaliana Information Resource Project—
NSF 99–50
Division of Biological Infrastructure

National Science Foundation
4201 Wilson Boulevard
Room 615
Arlington, VA 22230

Unless requested by NSF, additional information may not be sent following proposal submission.

C. FastLane Submission

In order to use NSF FastLane to prepare and submit a proposal, you must have the following software: Netscape Navigator 3.0 or above, or Microsoft Internet Explorer 4.01 or above; Adobe Acrobat Reader 3.0 or above for viewing PDF files; and Adobe Acrobat 3.X or Aladdin Ghostscript 5.10 or above for converting files to PDF.

To use FastLane to prepare the proposal your institution needs to be a registered FastLane institution. A list of registered institutions and the FastLane registration form are located on the FastLane Home Page. To register an organization, authorized organizational representatives must complete the registration form. Once an organization is registered, PIN for individual staff are available from the organization's sponsored projects office.

To access FastLane, go to the NSF Web site at *http://www.nsf.gov*, then select "FastLane," or go directly to the FastLane home page at *http://www.fastlane.nsf.gov/*. Please see "Instructions for Preparing and Submitting a Proposal to the NSF Directorate for Biological Sciences" located at *http://www.fastlane.nsf.gov/a1/BioInstr.htm*. Additionally, read the "PI Tipsheet for Proposal Preparation" and the "Frequently Asked Questions about FastLane Proposal Preparation," accessible at *https://www.fastlane.nsf.gov/a1/A1Prep.htm*.

IMPORTANT NOTE: For technical assistance with FastLane, please send an e-mail message to *biofl@nsf.gov*. If you have inquiries regarding other aspects of proposal preparation or submission, please contact the cognizant program officer, preferably *at least three weeks before the competition deadline*.

MERIT REVIEW

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Special care is taken to ensure that reviewers have no immediate and obvious conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority serving institutions, adjacent disciplines to that principally addressed in the proposal, first time NSF reviewers, etc.

Proposals will be reviewed against the following general merit review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgments.

1. What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field and across different fields? How well qualified is the proposer (individual or team) to conduct the project? To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

2. What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

In addition, reviewers will focus on the following issues:

- responsiveness to the expected scope;
- potential to advance international *Arabidopsis* genome and plant research;
- effectiveness of the project's organizational plan to reflect technical advances and new scientific discoveries;
- extent to which operation is focused on research community's needs;
- soundness and openness of the information-sharing plan and management of intellectual property rights;
- quality of the training environment for junior scientists; and,
- commitment to promote participation of members of underrepresented groups.

Where appropriate, reviewers will also consider:

- cohesiveness and soundness of the planned coordination for a multi-investigator project; and,
- efficiency and cost-effectiveness of the proposed approach for infrastructure development.

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can

engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learner perspectives. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give this careful consideration in making funding decisions.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens—women and men, underrepresented minorities, and persons with disabilities—is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give this careful consideration in making funding decisions.

B. Review Protocol and Associated Customer Service

Most proposals submitted to the NSF are reviewed by mail review, panel review, or some combination of mail and panel review.

Proposals submitted to this activity will be evaluated by a special emphasis panel formed to review the applications and mail reviewers. Site visits may be conducted as needed. NSF will be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 95 percent of proposals in this category.

GRANT AWARD AND ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made ***to the submitting organization*** by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the lead Principal Investigator.

B. Grant Award Conditions

Grants awarded as a result of this announcement are administered in accordance with the terms and conditions of NSF GC-1 (10/98), "Grant General Conditions" (10/98), or FDP-III (7/97), "Federal Demonstration Partnership General Terms and Conditions," or CA-1 "Cooperative Agreement General Terms and Conditions" (2/98), depending on the grantee organization. Copies of these documents are available at no cost from the NSF Publications Clearinghouse, P.O. Box 218, Jessup, Maryland 20794–0218, telephone (301) 947–2722, or via e-mail to *pubs@nsf.gov*. More comprehensive information is contained in the NSF *Grant Policy Manual* (NSF 95–26), available on the NSF OnLine Document System located at *http://www.nsf.gov/*, or for sale through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after expiration of a grant, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented a new electronic project reporting system, available through FastLane, which permits electronic submission and updating of project reports, including information on: project participants (individual and organizational); activities and findings; publications; and other specific products and contributions. Reports will continue to be required annually and after the expiration of the grant, but PIs will not need to re-enter information previously provided, either with the proposal or in earlier updates using the electronic system.

Effective October 1, 1998, PIs are required to use the new reporting format for annual and final project reports. PIs are strongly encouraged to submit reports electronically via FastLane. For those PIs who cannot access FastLane, paper copies of the new report formats may be obtained from the NSF Clearinghouse as specified above. NSF expects to require electronic submission of all annual and final project reports via FastLane beginning in October, 1999.

D. New Awardee Information

If the submitting organization has never received an NSF award, it is recommended that the organization's appropriate administrative officials become familiar with the policies and procedures in the NSF *Grant Policy Manual* which are applicable to most NSF awards. The "Prospective New Awardee Guide" (NSF 97–100) includes information on: Administration and Management Information; Accounting System Requirements and Auditing Information; and Payments to Organizations with Awards. This information will assist an organization in preparing documents that NSF requires to conduct administrative and financial reviews of an organization. The guide also serves as a means of highlighting the accountability requirements associated with Federal awards. This document is available electronically on NSF's Web site at *http://www.nsf.gov/cgi-bin/getpub?nsf97100*.

CONTACTS FOR ADDITIONAL INFORMATION

Inquiries regarding the announcement should be directed to the cognizant NSF official: Dr. Paul Gilna, Division of Biological Infrastructure, National Science Foundation, 4201 Wilson Boulevard, Room 615, Arlington, VA 22230. Telephone: (703) 306–1469; FAX: (703) 306–0356; E-mail: pgilna@nsf.gov

GENERAL INFORMATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers, and educators. The Foundation strongly encourages women, minorities, and persons with disabilities to compete fully in its programs. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF. Some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (NSF 91–54) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306–0090; FIRS at 1–800–877–8339.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees to provide or obtain data regarding the proposal-review process, award decisions, or the administration of awards; to government contractors, experts, volunteers, and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 *Federal Register* 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 *Federal Register* 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Reports Clearance Officer; Information Dissemination Branch, DAS; National Science Foundation; Arlington, VA 22230.

The program described in this announcement is in the category 47.074 (BIO) of the Catalog of Federal Domestic Assistance.

YEAR 2000 REMINDER

In accordance with NSF Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF-funded activity. Information concerning Year 2000 activities can be found on the NSF Web site at *http://www.nsf.gov/oirm/y2k/start.htm*.

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